

SOURCES FOR RESILIENT SOLUTIONS

The following provides information on sources for identifying resilient solutions.

The first section addresses general sources that communities can consult and reference. The second section provides sources of resilient solutions that address specific hazards or threats.

General Sources of Resilient Solutions

Subject Matter Experts (SMEs)

Participants of the Working Group and other community stakeholders can help to identify and evaluate resilience solutions that provide long-term solutions to the identified key issues and problem statements.

Existing Guides and Resources

Many publications and web-based resources are available to assist communities in the identification of resilience solutions. Additionally, the community can reference available resources from governmental agencies at the Federal, state, and regional level, as well as non-profit philanthropic and professional organizations. Colleges/universities and research organizations are another good source of resilience solutions best practices. Some of these resources are highlighted below:

- American Planning Association (APA) Hazards Planning Center: <https://planning.org/nationalcenters/hazards/>
- American Society of Civil Engineers (ASCE) Sustainable Engineering: http://blogs.asce.org/category/sustainable-engineering/?_ga=1.167583993.610367254.1466383095
- Association of Bay Area Governments (ABAG) Resilience Program: <http://resilience.abag.ca.gov/>
- Department of Housing and Urban Development Office of Economic Resilience: http://portal.hud.gov/hudportal/HUD?src=/program_offices/economic_resilience
- DHS Office of Infrastructure Protection Sector-Specific Plans details how the National Infrastructure Protection Plan's risk management framework is implemented within the sector's unique characteristics and risk landscape; <https://www.dhs.gov/critical-infrastructure-sectors>
- EPA Smart Growth: <https://www.epa.gov/smartgrowth>
- FEMA Building Science Program: <https://www.fema.gov/building-science>
- FEMA Mitigation Best Practices Portfolio: <http://www.fema.gov/mitigation-best-practices-portfolio>
- FEMA Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards: <https://www.fema.gov/media-library/assets/documents/30627>
- FEMA Risk Management Series: <https://www.fema.gov/media-library/collections/3>
- ICS-CERT Recommended Practices: <https://ics-cert.us-cert.gov/Recommended-Practices>
- Rockefeller Foundation's 100 Resilient Cities: <http://www.100resilientcities.org>
- Urban Land Institute (ULI) Infrastructure Initiative: <http://uli.org/research/centers-initiatives/infrastructure-initiative/>
- US-CERT Resources: <https://www.us-cert.gov/security-publications> and <https://www.us-cert.gov/related-resources>

Other Planning Resources

Other resources include reviewing other community plans, such as the community's hazard mitigation plan, capital improvements plan, hazard mitigation plans of surrounding communities and the state, etc. By connecting the community infrastructure resilience plan solutions with strategies that may have been identified in other community plans or in regional and state plans, the foundation for building support and buy-in at the time of implementation may be easier since these strategies have already been vetted through another planning process.

Sources of Threat or Hazard Specific Resilient Solutions

Natural Hazards | Solution Sources

| Disaster Type | Source | Description |
|--|--|---|
| Drought | Drought Response and Recovery Guide for Water Utilities, EPA https://www.epa.gov/waterutilityresponse/drought-response-and-recovery-guide-water-utilities | An Interactive, user-friendly guide provides worksheets, best practices, videos and key resources for responding to drought emergencies and building long-term resilience. The guide relays lessons learned from seven small- to medium-sized utilities nationwide that have responded to extreme drought conditions. |
| Flood | Flood Resilience: A Basic Guide for Water and Wastewater Utilities, EPA https://www.epa.gov/waterutilityresponse/flood-resilience-basic-guide-water-and-wastewater-utilities | With a user-friendly layout, embedded videos, and flood maps to guide you, EPA's Flood Resilience Guide is your one-stop resource to know your flooding threat and identify practical mitigation options |
| Flood Drought Hurricane | Sectoral Applications Research Program (SARP), NOAA https://cpo.noaa.gov/Meet-the-Divisions/Climate-and-Societal-Interactions/SARP/Extreme-Events-Case-Studies | The Sectoral Applications Research Program (SARP) supports interdisciplinary research to advance understanding of how climate change affects different economic sectors. There are various case studies that examine past practices and lessons learned. There are also resources available for webinars and workshops. |

| Disaster Type | Source | Description |
|---------------------|--|---|
| Pandemic | Interim Pre-Pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation, CDC http://www.flu.gov/planning-preparedness/community/community_mitigation.pdf | This document provides interim planning and guidance for state and local authorities other than mass vaccination and drug treatments that might be useful in reducing harm during a mass pandemic event. The document also provides interim guidance through the Pandemic Severity Index that will allow communities to administer an appropriate response based on the level of pandemic severity. |
| Pandemic | Pandemic Preparedness, WHO http://www.who.int/influenza/preparedness/pandemic/en/ | World Health Organizations guidance documents to inform and harmonize national and international preparedness and response to pandemics. |
| Winter Storm | Prepare Your Organization for Winter Storm Playbook, FEMA http://www.fema.gov/media-library-data/1409866131999-cd67474088f6e1eef8997242f261ed1a/prepareathon_playbook_winter_storms_final_090414_508a.pdf | Tools and Resource guide of best practices for community leaders to prepare for and administer post- major winter storm event activities. |

Technological Hazards | Solution Sources

| Disaster Type | Source | Description |
|---------------|---|---|
| Dam Failure | Dam Sector Web-Based Training Courses https://portal.damsafety.org/asdso-webinars-on-demand | Web based training courses for Dam Failure mitigation. |
| Dam Failure | Dams Sector Security Guidelines, DHS https://damsafety.org/sites/default/files/files/dams-sector-security-guidelines-2015-508.pdf | The “Dams Sector Security Guidelines” consolidates effective industry security practices into a framework to help owners and operators select and implement security activities and measures that reduce risk; improve the protection of personnel, public health, and public safety; and reinforce public confidence. Specifically, the “Dams Sector Security Guidelines” outline various strategies and methods to help select and implement security activities and measures appropriate to a facility. Each section of the document focuses on a distinct aspect of sector security practices—physical, cyber, personnel, and information—and includes industry-recognized effective practices and means by which to obtain additional information. |

| Disaster Type | Source | Description |
|---------------|--|---|
| Dam Failure | <p>Dams Sector-Specific Plan, NIPP DHS https://www.cisa.gov/sites/default/files/publications/nipp-ssp-dams-2015-508.pdf</p> | <p>This Dams Sector-Specific Plan (SSP) sets the strategic direction for voluntary, collaborative efforts to improve security and resilience over the next four years. As an annex to the NIPP 2013, this SSP tailors national strategic guidance to the unique operating conditions and risk landscape of the Dams Sector.</p> <p>The SSP describes how the Dams Sector manages risks and contributes to national critical infrastructure security and resilience, as set forth in Presidential Policy Directive 21: Critical Infrastructure Security and Resilience. It specifically describes cybersecurity activities that are supporting implementation of Executive Order 13636: Improving Critical Infrastructure Cybersecurity.</p> |
| Dam Failure | <p>Strategic Plan for the National Dam Safety Program https://www.fema.gov/media-library-data/8025e6039b9aebfa22e9f378347149c4/NDSP%20Strategic%20Plan_FEMA%20P-916.pdf</p> | <p>This Strategic Plan for the National Dam Safety Program (NDSP) presents the goals and objectives established by FEMA and its partners in the NDSP to reduce the hazards from dam failures in the United States. To achieve the goals and objectives, the Plan identifies the following supporting activities in the program areas funded under the Dam Safety Act of 2006: State assistance; research; training; and data collection, tracking, and analysis using the National Inventory of Dams (NID).</p> |

| Disaster Type | Source | Description |
|---|---|---|
| Hazardous Material Release | Emergency Response Plan for Hazardous Materials, Univ of Chicago https://safety.uchicago.edu/environmental-health/hazardous-waste-and-handling/emergency-response-plan-for-hazardous-materials/ | The document has been developed to minimize the severity of damage to human health and the environment in the event of an unexpected hazardous materials release. |
| Hazardous Material Release | Emergency response Planning for Hazardous Materials, Texas State Dept of Insurance http://www.tdi.texas.gov/pubs/videoresource/stperplan.pdf | This publication provides information and procedures on the Occupational Safety and Health Administration's (OSHA) requirements for emergency response and control of incidents involving hazardous material. |
| Hazardous Material Release Industrial Accident | Hazardous Waste Operations and Emergency response, OSHA, Dept of Labor https://www.osha.gov/OshDoc/data_General_Facts/factsheet-hazardouswaste.html | This booklet discusses OSHA's requirements for hazardous waste operations and emergency response at uncontrolled hazardous waste sites and treatment, storage, and disposal (TSD) facilities and summarizes the steps an employer must take to protect the health and safety of workers in these environments. |
| Hazardous Material Release Industrial Accident | Pipeline Security Guidelines, TSA https://www.tsa.gov/sites/default/files/tsapipelinesecurityguidelines-2011.pdf | Pipeline security guidelines are applicable to natural gas and hazardous liquid transmission pipelines, natural gas distribution pipelines, and to liquefied natural gas facility operators. Additionally, they apply to pipeline systems that transport materials categorized as toxic inhalation hazards (TIH). |
| Hazardous Material Release | Transportation Emergency Preparedness Program, Dept of Energy http://energy.gov/sites/prod/files/em/TEPP/2-b-2HazardousMaterialsIncidentResponse.pdf | This Transportation Emergency Preparedness Program (TEPP) Hazardous Materials Incident Response Model Procedure contains the recommended actions for response to Transportation incidents involving radioactive materials. |

| Disaster Type | Source | Description |
|-----------------------------|--|---|
| Industrial Accident | Patient Decontamination in a Mass Chemical Exposure Incident, National Planning Guidance for Communities, DHS http://www.phe.gov/Preparedness/responders/Documents/patient-decon-natl-plng-guide.pdf | Guide to planning and post incident coordination and response of large scale chemical exposure. |
| Mass Power Failure | Electric Power Disruption, Toolkit for Local Government, OES, State of California https://www.caloes.ca.gov/PlanningPreparednessSite/Documents/Electric%20Power%20Disruption%20Toolkit%20January%202020%20FINAL.pdf | Cal OES has developed this "Tool Kit" as a supplement to the <i>Emergency Planning Guidance for Local Governments</i> to identify possible actions that city and/or county governments can take to protect public health and safety during electric power disruptions, regardless of their cause. It also provides preparedness, response, recovery, and mitigation actions relevant to electric power disruptions. |
| Radiological Release | Federal Guidelines for Radiation Protection, EPA https://www.epa.gov/radiation/federal-guidance-radiation-protection | Collection of reports and policy guidelines on the release of radiological material. |
| Radiological Release | Manual for First Responders to a Radiological Emergency, IAEA http://www-pub.iaea.org/mtcd/publications/pdf/epr_firstresponder_web.pdf | Manual for first responders of Radiological releases. This published by the IAEA, but has domestic information as well. |
| Radiological Release | Radiation Emergency Response Plan, Univ of Las Vegas https://rms.unlv.edu/radiological/RadSafety-Emergency-Response-Plan%20Final.pdf | The Radiation Emergency Response Plan contains policy, classification and procedures for the handling of emergency situations involving radiological material at the Univ of Las Vegas. It contains general information for first responders. |

| Disaster Type | Source | Description |
|-----------------------------|---|--|
| Radiological Release | Radiological Emergency Preparedness Program https://www.fema.gov/radiological-emergency-preparedness-program | The REP Program coordinates the National effort to provide state, local, and tribal governments with relevant and executable planning, training, and exercise guidance and policies necessary to ensure that adequate capabilities exist to prevent, protect against, mitigate the effects of, respond to, and recover from incidents involving commercial nuclear power plants (NPPs). |
| SCADA System Failure | Developing an Industrial Control Systems Cybersecurity Incident Response Capability https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-82r2.pdf | This document will present recommendations to help those facilities that use control systems better prepare for and respond to a cyber incident regardless of source. The document also suggests ways to learn from incidents and to strengthen the system against potential attacks. The document includes accepted methods and approaches from tradition information technology, but is primarily focused on the unique aspects of industrial control systems. |
| SCADA System Failure | Guide to Supervisory Control and Data Acquisition(SCADA) and Industrial Control Systems Security, NIST https://www.dhs.gov/sites/default/files/publications/csd-nist-guidetosupervisoryanddataacquisition-scadaandindustrialcontrolsystemssecurity-2007.pdf | This document provides guidance for establishing secure industrial control systems. The document provides an overview of these industrial control systems and typical system topologies, identifies typical threats and vulnerabilities to these systems, and provides recommended security countermeasures to mitigate the associated risks. |
| SCADA System Failure | Industrial Control System Cyber Emergency Response Team https://ics-cert.us-cert.gov/Assessments | Collection of Program Assessments, as well as Cyber Security Evaluation Tool to mitigate and evaluate SCADA systems |

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|-------------------------|--|--|
| Train Derailment | Emergency Preparedness, Federal Railroad Admin, Dept of Trans https://www.fra.dot.gov/Page/P0298 | This subprogram research area is directed at the safe and efficient passenger rail car evacuations during various emergency scenarios. A goal is to determine, if time-based evacuation criteria can replace existing prescriptive rules on the number and configuration of emergency exits. |
| Train Derailment | Emergency Response to Unit Train Incidents, CSX Corp. https://www.btfire.org/ftp/Documents/CSX%20Unit%20Train%20ER%20Guide.pdf | This guide provides response information to emergency first responders dealing with unit trains carrying hazardous materials. This was developed by the CSX Corporation. |
| Train Derailment | Railroad Emergency Plan, Monroe County, NY https://www.monroecounty.gov/File/PUBLIC%20SAFETY/OEM/Railroad%20Plan.pdf | Methods and procedures designed to protect life and property in the event of a rail disaster, to render aid to the municipality in which the accident occurred, and to protect the emergency scene and preserve evidence for further investigation. This was created by Monroe County, NY |

Human-Caused Hazards | Solution Sources

| Disaster Type | Source | Description |
|--|--|---|
| Biological Event | Interim Pre-Pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation, CDC http://www.flu.gov/planning-preparedness/community/community_mitigation.pdf | This document provides interim planning and guidance for state and local authorities other than mass vaccination and drug treatments that might be useful in reducing harm during a mass pandemic event. The document also provides interim guidance through the Pandemic Severity Index that will allow communities to administer an appropriate response based on the level of pandemic severity. |
| Biological Event | Preparation and Planning for Bioterrorism's Emergencies http://emergency.cdc.gov/bioterrorism/prep.asp | Collection of planning and guidance documents for bioterrorism events. |
| Biological Event Chemical Event | Biological and Chemical Terrorism: Strategic Plan for Preparedness and response, CDC https://www.cdc.gov/mmwr/preview/mmwrhtml/rr4904a1.htm | This report is a summary of the recommendations made by CDC's Strategic Planning Workgroup in <i>Preparedness and Response to Biological and Chemical Terrorism: A Strategic Plan</i> (CDC, unpublished report, 2000), which outlines steps for strengthening public health and health-care capacity to protect the United States against these dangers |
| Chemical Agent | Emergency response Planning for Hazardous Materials, Texas State Dept of Insurance http://www.tdi.texas.gov/pubs/videoresource/stperplan.pdf | This publication provides information and procedures on the Occupational Safety and Health Administration's (OSHA) requirements for emergency response and control of incidents involving hazardous material. |
| Chemical Agent | Patient Decontamination in a Mass Chemical Exposure Incident, National Planning Guidance for Communities, DHS http://www.phe.gov/Preparedness/responders/Documents/patient-decon-natl-plng-guide.pdf | Guide and best-practices on mass decontamination of civilian population. |

| Disaster Type | Source | Description |
|--------------------------------|---|--|
| Chemical Event Sabotage | Pipeline Security Guidelines, TSA https://www.tsa.gov/sites/default/files/tsapipelinesecurityguidelines-2011.pdf | Pipeline security guidelines are applicable to natural gas and hazardous liquid transmission pipelines, natural gas distribution pipelines, and to liquefied natural gas facility operators. Additionally, they apply to pipeline systems that transport materials categorized as toxic inhalation hazards (TIH). |
| Civil Unrest-Riots | Law Enforcement Guide for Emergency Operations, OES, State of California https://www.caloes.ca.gov/LawEnforcementSite/Documents/Red%20Book%20ADA%20Compliant.pdf | The <i>2016 Law Enforcement Guide for Emergency Operations</i> is designed to be a practical field-oriented guide to assist law enforcement personnel throughout the State of California with <i>implementation</i> of the <i>Field Level Incident Command System</i> . The guide can also be an excellent emergency response tool for law enforcement managers, as well as line officers and deputies. This report incorporates the concept and statutory requirement of the Standardized Emergency Management System (SEMS). |
| Cyber Incident | Cybersecurity Framework, NIST http://www.nist.gov/cyberframework/cybersecurity-framework-industry-resources.cfm | A listing of publicly available Framework resources. Resources include, but are not limited to: approaches, methodologies, implementation guides, mappings to the Framework, case studies, educational materials, Internet resource centers (e.g., blogs, document stores), example profiles, and other Framework document templates. |

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| Cyber Incident | Cybersecurity Framework, NIST http://www.nist.gov/cyberframework/cybersecurity-framework-industry-resources.cfm | A listing of publicly available Framework resources. Resources include, but are not limited to: approaches, methodologies, implementation guides, mappings to the Framework, case studies, educational materials, Internet resource centers (e.g., blogs, document stores), example profiles, and other Framework document templates. |
| Cyber Incident | Cybersecurity Risk Management Process(PMP), DoE http://energy.gov/oe/downloads/cybersecurity-risk-management-process-rmp-guideline-final-may-2012 | The RMP is written with the goal of enabling organizations to apply effective and efficient risk management processes and tailor them to meet their organizational requirements. This guideline may be used to implement a new cybersecurity program within an organization or to build upon an organization's existing internal cybersecurity policies, standard guidelines, and procedures. |
| Cyber Incident | Cyberterrorism Defense Initiative, FEMA http://www.cyberterrorismcenter.org/ | The Cyberterrorism Defense Initiative (CDI) program was created to provide comprehensive, transferable, and inexpensive cyberterrorism training to qualifying technical personnel throughout the United States. Classes are offered free-of-charge to technical personnel and managers working within agencies or organizations considered as a part of our nation's critical infrastructure. |

| Disaster Type | Source | Description |
|------------------------------|--|--|
| Cyber Incident | Developing an Industrial Control Systems Cybersecurity Incident Response Capability https://ics-cert.us-cert.gov/sites/default/files/recommended_practices/final-RP_ics_cybersecurity_incident_response_100609.pdf | This document will present recommendations to help those facilities that use control systems better prepare for and respond to a cyber incident regardless of source. The document also suggests ways to learn from incidents and to strengthen the system against potential attacks. The document includes accepted methods and approaches from tradition information technology, but is primarily focused on the unique aspects of industrial control systems. |
| Radiological Incident | Manual for First Responders to a Radiological Emergency, IAEA http://www-pub.iaea.org/mtcd/publications/pdf/epr_firstresponder_web.pdf | Manual for first responders of Radiological releases. This published by the IAEA, but has domestic information as well. |
| Radiological Incident | Radiation Emergency Response Plan, Univ of Las Vegas https://rms.unlv.edu/radiological/RadSafety-Emergency-Response-Plan%20Final.pdf | The Radiation Emergency Response Plan contains policy, classification and procedures for the handling of emergency situations involving radiological material at the Univ of Las Vegas. It contains general information for first responders. |
| Radiological Incident | Radiological Emergency Preparedness Program https://www.fema.gov/radiological-emergency-preparedness-program | The REP Program coordinates the National effort to provide state, local, and tribal governments with relevant and executable planning, training, and exercise guidance and policies necessary to ensure that adequate capabilities exist to prevent, protect against, mitigate the effects of, respond to, and recover from incidents involving commercial nuclear power plants (NPPs). |

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|---|---|--|
| Sabotage Civil Unrest- Riots | Buffer Zone Protection Program https://www.fema.gov/media-library/assets/documents/20601 | Guidance and Application Kit for Buffer Zone Protection of critical infrastructure. |
| Terrorist Event Sabotage | Managing the Emergency Consequences of Terrorist Incidents, FEMA https://www.fema.gov/pdf/plan/managingemerconseq.pdf | <p>The guidance in this document is designed to provide State and local emergency management planners:</p> <p>A framework for developing supplemental emergency operations plans adequate for addressing the consequences of a terrorist act involving weapons of mass destruction; A consistent planning approach that will foster efficient integration of State, local, and Federal terrorism consequence management activities; The most current information regarding the planning and operational challenges faced by communities that have dealt with terrorist events.</p> |
| Terrorist Event Sabotage | Emergency Response to terrorism: Tactical Considerations: Company Officer, State of Michigan, FEMA https://www.michigan.gov/documents/dleg_bccfs_manual_ert_tc_company_officer_161654_7.pdf | Training manual for first responders in an active terrorist event. |